

Permeability of the Endothelial and Epithelial Barrier to Albumin Flux in the Sheep Lung, Stewart, Paul A.**, and Gorin, A.B., U.C. Davis, Davis, Calif. 95616

We studied 15 sheep with chronic lung lymph fistulas and measured the time course of the normal flux of albumin between the plasma and broncho-alveolar lumen (BAL) under baseline conditions. Fractional equilibration of tracer in the BAL and pulmonary interstitium (IS) were determined at varying times after intra-arterial injection of 100 μ Ci I^{125} albumin at $t=0$. Equilibration occurred in the airfilled lung. Luminal fluid was sampled using the fiberoptic bronchoscope. We measured protein bound radioactivity and albumin content of all samples (plasma (P), lymph (L), and alveolar lavage fluid (A)). The $t_{1/2}$ for albumin in the alveolar lavage was 16.6 hours ($r=-0.97$) compared to a normal $t_{1/2}$ of 2.4-3 hours in pulmonary lymph.

Minutes after t_0	15-40	215-445	1310-1775	2490-3315
n=	12	13	13	14
[A]/[P]*	2.3 \pm .3	6.5 \pm 1.4	20.9 \pm 3.4	57.3 \pm 3.0
[A]/[L]*	0	16.1 \pm .03	23.3 \pm .06	73.2 \pm .06
[L]/[P]*	10.6 \pm 3.1	44.5 \pm 3.3	97.9 \pm 8.1	---

*[CPM/gm albumin], ratio $\times 10^{-2} \pm$ S.E.M.

We conclude that the plasma proteins present in alveolar lavage fluid reach the alveolar space by a normal diffusive process, not as a result of epithelial damage occurring at the time of lavage. Although lymph and plasma are substantially equilibrated within 24 hours, the BAL has not reached equilibrium with either the vascular or IS compartment at 48 hours after tracer administration. In the airfilled lung, albumin flux into the BAL is characterized by 2 exponential phases. Movement of albumin across the epithelial barrier in phase 1 (lasting 24 hours) is slower than in phase 2. (Supported in part - USPHS Pulmonary SCOR grant HL 19155). ** ALA Clinical Fellow

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